

General Solutions

Summary

$$\tan \theta = \tan \alpha$$

$$\theta = n\pi + \alpha, n \in \mathbb{I}$$

$$\cos \theta = \cos \alpha$$

$$\theta = 2n\pi \pm \alpha, n \in \mathbb{I}$$

$$\sin \theta = \sin \alpha$$

$$\theta = n\pi + (-1)^n \alpha, n \in \mathbb{I}$$

α is any angle that is a solution of the given equation. The angle given from your calculator will suffice.

EXERCISES 5.7

A1. Determine the general solution of each equation:

(a) $\tan \theta = 2$

(b) $\cos \theta = 0.5$

(c) $\sin \theta = 0.5$

(d) $\tan \theta = 1$

(e) $\cos \theta = \cos 1.47$

(f) $\sin \theta = \sin 0.20$

(g) $\tan \theta = \tan 0.98$

(h) $\sin \theta = 0.8$

(i) $\tan \theta = -1$

(j) $\sin \theta = -0.5$

(k) $\cos \theta = -0.9$

(l) $\cos \theta = -0.5$

(m) $\sin \theta = -0.75$

(n) $\tan \theta = -4$

(o) $\sin \theta = \sin 1.2$

(p) $\cos \theta = \cos(-0.2)$

(q) $\tan \theta = \sqrt{3}$

(r) $\cos \theta = -\frac{1}{2}$

(s) $\sin \theta = \frac{1}{\sqrt{2}}$

(t) $\tan \theta = -\frac{1}{\sqrt{3}}$

2. Solve each equation for its general solution:

(a) $4\tan \theta = 3$

(b) $2\cos \theta - 1 = 0$

(c) $\sin \theta - \frac{3}{4} = 0$

(d) $2\sin \theta = 5$

(e) $3\cos \theta + 1 = 0$

(f) $1 + \tan \theta = 0$

(g) $4\sin \theta + 1 = 0$

(h) $3\cos \theta - 2 = 0$

B3. Solve each equation:

(a) $\cos(\theta + 1.2) = 0.65$

(b) $\tan(\theta + \frac{\pi}{4}) = \sqrt{3}$

(c) $\sin(\theta - 0.37) = -0.15$

(d) $\cos(\theta - 2.2) = -0.54$

(e) $3\tan(\theta - 2.5) = 1$

(f) $2\sin(\theta + \frac{\pi}{6}) = 1$

(g) $2\cos(\theta + \frac{\pi}{4}) = -1$

(h) $3\tan(\theta + \frac{\pi}{3}) = \sqrt{3}$

(i) $2\sec(\theta - 2.5) = 5$

4. Solve each equation:

(a) $\sin \frac{1}{2}\theta = 0.3$

(b) $\cos 2\theta = 0.6$

(c) $\tan 3\theta = 1$

(d) $\cos \frac{\theta}{3} = -\frac{1}{6}$

Exercises 5.7 ($n \in \mathbb{I}$ should be assumed to be stated after each solution)

1. (a) $n\pi + 1.11$ (b) $2n\pi \pm \frac{\pi}{3}$ (c) $n\pi + (-1)^n \frac{\pi}{6}$

(d) $n\pi + \frac{\pi}{4}$ (e) $2n\pi \pm 1.47$ (f) $n\pi + (-1)^n \times 0.20$

(g) $n\pi + 0.98$ (h) $n\pi + (-1)^n \times 0.93$ (i) $n\pi - \frac{\pi}{4}$

(j) $n\pi - (-1)^n \frac{\pi}{6}$ (k) $2n\pi \pm 2.69$ (l) $2n\pi \pm \frac{2\pi}{3}$

(m) $n\pi - (-1)^n \times 0.85$ (n) $n\pi - 1.33$

(o) $n\pi + (-1)^n \times 1.2$ (p) $2n\pi \pm 0.2$ (q) $n\pi + \frac{\pi}{3}$

(r) $2n\pi \pm \frac{2\pi}{3}$ (s) $n\pi + (-1)^n \frac{\pi}{4}$ (t) $n\pi - \frac{\pi}{6}$

2. (a) $n\pi + 0.64$ (b) $2n\pi \pm \frac{\pi}{3}$

(c) $n\pi + (-1)^n \times 0.85$ (d) No solutions

(e) $2n\pi \pm 1.91$ (f) $n\pi - \frac{\pi}{4}$

(g) $n\pi - (-1)^n \times 0.25$ (h) $2n\pi \pm 0.84$

3. (a) $2n\pi \pm 0.86 - 1.2$ (b) $n\pi + \frac{\pi}{12}$

(c) $n\pi - (-1)^n \times 0.15 + 0.37$ (d) $2n\pi \pm 2.14 + 2.2$

(e) $n\pi + 2.82$ (f) $n\pi + (-1)^n \frac{\pi}{6} - \frac{\pi}{6}$

(g) $2n\pi \pm \frac{2\pi}{3} - \frac{\pi}{4}$ (h) $n\pi - \frac{\pi}{6}$

(i) $2n\pi \pm 1.16 + 2.5$

4. (a) $2n\pi + (-1)^n \times 0.61$ (b) $n\pi \pm 0.46$

(c) $\frac{n\pi}{3} + \frac{\pi}{12}$ (d) $6n\pi \pm 5.21$ (e) $4n\pi - 4.43$

(f) $\frac{n\pi}{2} + (-1)^n \frac{\pi}{4}$ (g) $\frac{n\pi}{4}$ (h) $4n\pi$

(i) $\frac{n\pi}{2} + (-1)^n \frac{\pi}{6}$ (j) $2n\pi - \frac{2\pi}{3}$

(k) $2n\pi - (-1)^n \frac{\pi}{2}$ (l) $\frac{2n\pi}{3} \pm \frac{\pi}{9}$